DEVELOPING INTERACTIVE LEARNING MEDIA (BOARD COORDINATES) IN IMPROVING STUDENTS' CREATIVE THINKING ABILITY

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Abstract: The problem of this study is the low ability of students' creative thinking skill which is shown by learning activities in the classroom that are still passive. Besides that teachers are more likely to be preoccupied with how to get all the material immediately given to students, so that the development of thinking ability in school is rarely done. Based on the results of pre-research on the mathematics subject in elementary school showed the test results of creative thinking ability of six grade students in a primary school in Kuningan Regency still shows the low ability of creative thinking. This is seen from 28 six grade students, 14.29% of students are assessed to have good creative thinking ability, while the rest of 85.71% still shows the low ability of creative thinking. One solution to overcome this problem is to develop interactive learning media in mathematics learning. The purpose of this study was to determine the effectiveness of learning media developed in elementary school mathematics learning. The method used in this study is the research and development method (RnD) referring to Borg and Gall. Subjects in this study were elementary school students of six grade in Kuningan Regency. Research process and media development was done for 6 months with 3 times of media improvement so that the media is obtained appropriately. The results showed the enthusiasm of learners, meaning that the learning media developed gives a good influence on the learning process and good results. Thus it can be concluded that the media developed is effective in improving students' creative thinking skills.

Keywords: Creative Thinking Ability; Interactive Media; Coordinate Board.

1. Introduction

The level of success of the nation development can be determined by the quality of its human resources. Quality of human resources can be shaped by education, from primary education to higher education. Education enables students to develop their talents, creativity and ability to think optimally. Educational thinkers and researchers believe that every individual has the potential for creativity, and education has a responsibility in developing the creativity of students. (Ferrari, Cachia, & Punie, 2009; Moran, 2010).

The phenomenon that occurs in the field shows that there is an indication of low creative thinking ability. One of them is shown by students lacking the ability to develop ideas, students lack the ability to express various solutions or problem approaches.

Many factors influence the low ability of creative thinking of students. Banaji et al., 2010; Brady & Edelman, 2012; Moran, 2010 revealed that lack of resources and knowledge, policies and curriculum for creativity development, domination of traditional teaching methods, lack of media or creative tools and assessment of nar-row-based tests. In addition Raiyan (2016), Ratna Ningsih (2016) and Rosyadi (2014) report the results of research that learning using interactive media is able to develop high-level thinking skills (HOT) of students.

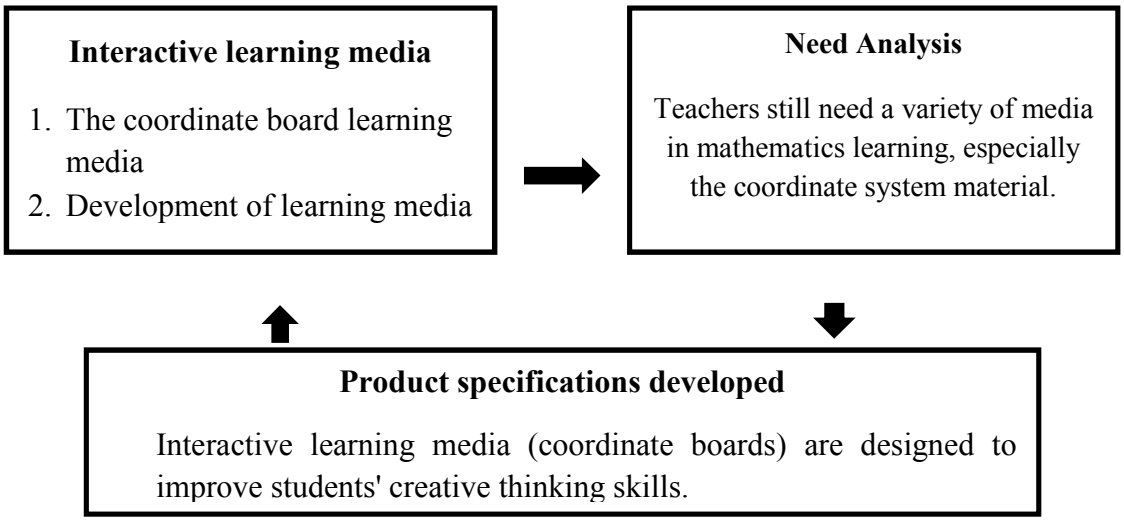
Creative thinking is one of the highest levels of a person in thinking, that is, recall, basic thinking, critical thinking, and creative thinking. Karik and Rudnik in Saefudin (2012: 41), Maulana in Fitriana (2016: 175), Putra (2012) and Alimudin (2009) have the same view that creative thinking can produce or develop a new thing, either in the form of ideas, concepts, information or other things. The ability to think creatively can be identified if the ability is reflected through one's behavior. According to Evans, Guilford and Torrance (Jazuli, 2009: 213) mentions creative thinking characteristics including: fluency, flexibility, originality, problem sensitivity, elaboration.

Research Question

Is the learning media developed able to improve the ability to think creatively in mathematics subjects in Kuningan District?

Frame of Mind

Education is a process in which students will experience a process of recognition of various things so that students have knowledge, and can develop thinking skills. Students' creative thinking skills need to be developed so that students can solve existing problems so they can make the right decisions. To develop students' thinking skills, a stimulus is needed when learning. Many factors that influence students' thinking ability apart from the teacher also need facilities that facilitate learning, namely the use of learning media. Learning media used must also be interactive so as to foster student interest and can help students in learning. From the above statements, the frame of mind of this research can be seen in the following figure:



Hypothesis

The hypothesis is a temporary answer to research problems, until proven through collected data (Arikunto, 2013: 110). The hypothesis in this study is that interactive media are developed effectively in improving creative thinking skills.

2. Research Methodology

1. Research Design

The design used in this research is the research and development method (R N D) refers to Borg & Gall model.

2. Participants

The research subject is the main source of research data, which has data about the variables studied (Badriah, 2012: 54). The participants in this study were sixth grade students in several elementary schools in Kuningan Regency. The details are as follows:

Table 1

Research Participants

Elementary Schools	Class	Total	Information
Sindang 1	VI	28	Limited trial
Sindang 2	VI	37	Limited trial
Pasayangan	VI	28	Limited trial
Pajawan	VI B	24	Limited trial
	VI A	26	Extensive trial
Manggari	VI	36	Extensive trial
Lebakwangi	VI	33	Extensive trial
Mekarwangi	VI	28	Extensive trial
Cikaso	VI A	26	Extensive trial
	VI B	24	Extensive trial
Total		**290**	

3. Data Collection Technique

The data collection techniques used in this study are using questionnaires, interviews and tests. The questionnaire was aimed at developing media validation, consisting of validation of media experts, material experts, and product attractiveness. Interviews are used to conduct preliminary studies. Test to measure the effectiveness of media in improving students' creative thinking skills.

Table 2

Scoring Guidelines of Creative Thinking Skills

Aspects	Student Response to Problems	Score
Fluency	Not answering / giving ideas that are not relevant for problem solving	0
	Give an idea that is not relevant to problem solving	1

	Give a relevant idea but the answer is wrong	2
	Give more than one relevant idea but the answer is still wrong	3
	Provide more than one idea that is relevant to problem solving and its disclosure is complete and clear	4
F*lexibility*	Not answering / giving ideas that are not relevant for problem solving	0
	Giving answers is only one way and there is a mistake in the calculation process so the results are wrong	1
	Give answers in one way, the calculation process and the results are correct	2
	Give answers in more than one way (variety) but the results are wrong because there are errors in the calculation process	3
	Providing answers in more than one way (variety), the calculation process and the results are correct	4
Elaboratio n	Don't answer / give the wrong answer	0
	There are errors in expanding the situation without details	1
	There is an error in expanding the situation and accompanied by details that are less detailed	2
	Extending the situation correctly and detailing it is not detailed	3
	Expand the situation correctly and detail it in very detail	4
O*riginality*	Don't answer / give the wrong answer	0
	Give answers in their own way but not understandable	1
	Providing answers in its own way, the calculation process has been directed but not completed	2
	Give answers in their own way but there are errors in the calculation process so the results are wrong	3
	Provide answers in their own way and the calculation process and the results are correct	4

Bosch in Munandar (2010:45)

3. Results

a. The initial state of mathematics learning

Based on the results of field research, the majority of achievements in learning focus on learning outcomes. So it is not surprising when researchers conducted a pre-research test in the form of a test of creative thinking ability, the results showed that students' creative thinking ability was still low. This is in line with the results of Aisyah's (2008: 4) study that the low ability of students to think due to the development of thinking skills in schools is rarely carried out. Whereas in this case mathematics is a strategic subject in developing high-level thinking skills (HOT) one of which is creative thinking. This is as stated in the Ministry of National Education (Prihandoko, 2006: 21) that the purpose of mathematics learning is to train and foster ways of thinking systematically, logically, critically, creatively and consistently, and developing a persistent and confident attitude in solving problems.

The low ability of creative thinking of students, one of which is triggered by the pattern of mathematics learning used by teachers so far in class is still conventional. The media used is still limited to the use of textbooks, whiteboards and devices. Very few educators use learning

media that make students more active and enthusiastic in learning. Arsyad (2011: 16) suggests that media can help students improve understanding, present data with interesting and reliable, facilitate interpretation of data and compact information. Sugihartono (2007: 25) added that media has a contribution to explain things that are abstract and show hidden things.

b. Developed Learning Media Design

The media developed underwent several stages of improvement and experimentation in the implementation of its development. The initial stage was the collection of materials for making media. The finished product before the trial was carried out by validation test by material experts and media experts. The results of the material expert validation show the average score included in the Good criteria. Even so there are some parts in the material that must be revised according to the advice given by the material expert.

After the revision of the material expert's suggestion, a validation test was conducted by the media expert who obtained the average score classified as good. Just as in terms of material, medical experts suggest several revisions before testing the field. After revisions from material experts and media experts, media products were ready to be piloted on a limited scale.

This limited-scale trial phase involved 4 classes from 4 different schools with 2 control classes and 2 experimental classes. The results showed an increase in the average score from the pretest to the post test. Also seen the experimental class that uses interactive media (coordinate board) has an average score higher than the control class that uses conventional media. In addition, in this limited scale trial respondents from the experimental class were given a questionnaire in the form of an assessment of media attractiveness. The result is that the interactive media developed are considered attractive by respondents with several revisions made, then the media is ready to be tested on a wide scale.

c. The Effectiveness of Learning Media Developed

The effectiveness of learning media developed in optimizing students' creative thinking skills. If optimized is defined as a significant difference between the results of the pretets and posttest, then the trial of the development of learning media to improve the ability to think creatively through research and development (Research and Development) shows significant success in optimizing students' creative thinking skills. Where the results of each trial show an increase or optimization of the achievement of an increase in the ability to think creatively through a trial test.

Then, if the achievement of the test results of students participating in learning using the developed learning media compared to the acquisition of conventional learning results (regular teaching), then there is a significant difference. Where the results of the t test that compares the average score / score of the test results (posttest) between the two classes (experiment and control) produce a significant value of less than 0.05 which indicates a significant difference. This means that the optimization of the test results achieved by the experimental group students (consisting of 3 classes) is significantly higher than those obtained by the control group students. The positive and significant increase in student test results also shows that students perform activities with optimal enthusiasm and high motivation.

Large scale field trials were carried out with 3 stages divided into 3 groups. The first group obtained the results of the test on the control class on the average posttest 64.01 while the experimental class posttest average score 79.68. The second group obtained the test results in the control class an average value of 61.53 while the experimental class averaged 80.11. The third group obtained the test results in the control class an average value of 69.53 while the experimental class averaged 80.76. Of the three stages of a large-scale field trial, the results show that learning using interactive media (coordinate boards) has increased values more than the use of learning without using interactive learning media (coordinate boards).

The increase in the test results of students as positively and significantly also shows that students carry out activities with optimal enthusiasm and high motivation. this is in line with the research conducted by Patnaningsih (2016: 3) interactive media capable of directing and

developing the ability to think critically and creatively in students. Likewise with the results of research conducted by Rosyadi (2014), that classes with learning using interactive media (experiments) have an average value of creative thinking ability better than classes that do not use interactive media (control).

This happens because they feel there is something different in the learning of mathematics. With enthusiasm, students showed that the learning media developed had a good influence on the learning process and good results. Thus the media learning media developed has contributed to the increase in the learning process and good results in each class. Thus, the learning media developed to improve students' creative thinking skills are quite effective (successful) in optimizing student learning outcomes.

d. Driving And Inhibiting Factors

Based on the findings of the research results in the field, there are driving and inhibiting factors in learning using interactive media board coordinates. The driving and inhibiting factors are as follows:

a. Driving factors

1) The media used does not require special skills such as multimedia usage. So that educators and students do not need special training in using them.

2) Not limited by facilities and infrastructure because this media can be made easily also economically.

3) Students can explore freely when using interactive media (coordinate boards) developed.

4) Avoid boredom and boredom during learning because kinesthetic students are also directly involved in learning.

b. Inhibiting factors

1) The more students, the longer the learning process will be. This is due to the limited learning media, but students are required to have experience in using the media.

2) The learning process is still based on guidance from educators.

4. Conclusion

Based on the results of research and development conducted reveal that interactive learning media (coordinate boards) were developed effectively in improving students' thinking skills. meaning that when learning students are more enthusiastic in participating in learning activities so that students can actively discuss and asking activities are more developed, this shows that the quality of learning using interactive learning media (coordinate board) is better and better than learning using conventional media as well can improve students' creative thinking skills.

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